

# Integrated Reconfigurable Aero and Propulsion Control for Improved Flight Safety of Commercial Aircraft, Phase I

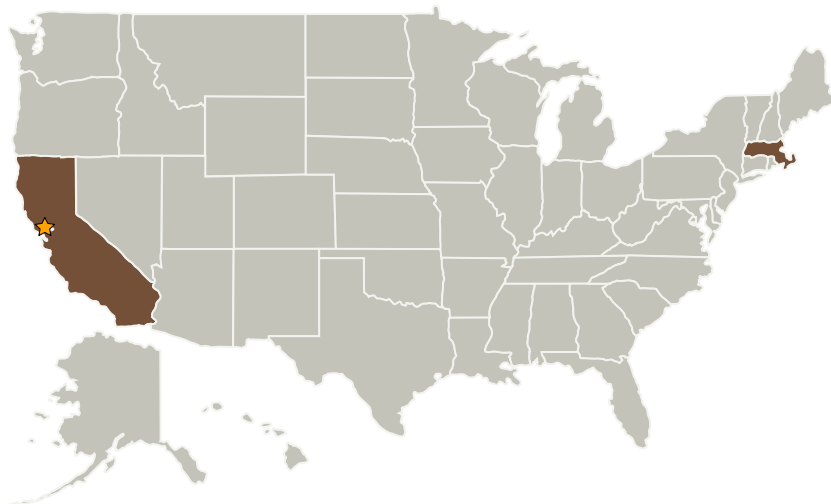
Completed Technology Project (2008 - 2008)



## Project Introduction

The main objective of this project is to develop and test a novel innovative Integrated Reconfigurable Aero & Propulsion Control (IRAP) system that achieves flight safety improvement in commercial aircraft. The main feature of the proposed IRAP system is that it is well suited for uncertain plants containing actuators operating on different time scales. The focus under this project is on the flight control system design for aircraft with fast actuators moving the flight control surfaces, and engines characterized by a slower response. The IRAP system will be developed for operation under faults, failures, damage and other upsets. The technique that will be used to achieve the related reconfigurable control objectives is referred to as the Sequential Signal Filtering for Certainty-Equivalence Adaptive Control (SSF-CEAC). Specific Phase I tasks include: (i) Problem formulation; (i) Adaptive control design for the case of aero-only control; (ii) Adaptive control design for the case of propulsion-only control; (iii) Integrated reconfigurable aero & propulsion control design; and (iv) Performance evaluation of the IRAP system. In collaboration with Boeing Phantom Works, in Phase II we plan to pursue extensions of the proposed approach to MIMO nonlinear models, further development of control allocation strategies, pilot interface design, integrated adaptive control design for safe landing under severe failures and damage using engines only, and IRAP software toolbox development.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Ames Research Center (ARC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Scientific Systems Company, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts

## Primary U.S. Work Locations

California	Massachusetts
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Jovan Boskovic

## Technology Areas

**Primary:**

- TX10 Autonomous Systems
  - └ TX10.2 Reasoning and Acting
    - └ TX10.2.6 Fault Response